

to be typically medical or surgical cases. He meets few of the end results of institutional care and therefore does not consider the psychiatric case as one apart from the rest of the medical problems he is attempting to solve.

The training of pupil nurses in the handling of psychiatric cases is not only useful in graduating nurses who will devote their lives to this work, but presents an even more important function in giving the nurse who intends to devote herself to general nursing, or even to the other medical specialties, a psychiatric attitude that will prove most helpful to her patient and to herself. We have frequently been told that pupil nurses who have completed their services in the psychiatric ward and gone into other wards have shown a surprising ability to handle the ordinarily difficult patient.

SUMMARY

To sum up, the psychiatric ward in the general hospital, together with its out-patient department, offers to the patient facilities for a diagnosis of incipient psychiatric conditions at a time when therapy is of most value. It enables the patient to receive advice without conflicting with his prejudices, or feelings of guilt or shame. It offers to him and his family ideas of mental hygiene, without the need of overcoming a spirit of antagonism. The psychopathic ward offers to the general hospital facilities and an organization prepared to care for the difficult cases which would otherwise disrupt the smoothly running operation of the various services. It serves as a demonstration ground for the staff where the potentialities of psychotherapy may be displayed. It equips young men in their student and intern years, as well as pupil nurses, with psychiatric experience. It acts as a middle ground where both psychiatric and somatic conditions can be studied. Not until every general hospital is equipped with a well organized psychopathic ward will the psychiatric patient receive that early attention which is essential to the complete carrying out of any mental hygiene program.

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REGIONAL ANESTHESIA—ITS MODERN TECHNIQUE AND THERAPEUTIC APPLICATION*

I

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PRODUCTION of loss of sensibility for surgical and medical purposes has been aimed at since the days of ancient history. As pointed out by H. Braun, the oldest traditions in written form in our possession contain references to the induction of artificial sleep. Egyptians and Chinese, Greek and Roman physicians, as well as the "med-

icine men" of primitive African tribes, were acquainted with the intoxicating properties of certain vegetable juices and utilized these in the form of beverages for the relief of pain in surgical interventions.

INITIAL WORK OF RECLUS

In our modern age, one of the earliest pioneers of local anesthesia was Paul Reclus, of the University of Paris. For over a quarter of a century prior to the beginning of the World War, since 1889, Reclus had used local anesthesia for operative and therapeutic purposes. Although his method was far from satisfactory, it was rapidly adopted by various French and German surgeons, spreading from these countries throughout the civilized world. The method employed by Reclus was that of infiltration with cocain solution (1.0 of cocain in five per cent solution.) Because of the high toxicity and extremely rapid absorption of this drug, especially from closed cavities lined with mucosa or serosa, this method had a very limited field in surgery and an even more restricted range in therapeutics.

INFILTRATION METHOD

The rapid evolution of local anesthesia may be said to have set in since the discovery of Novocain, by Einhorn, in Germany, in 1905. "Novocain" is the proprietary brand name for procain hydrochloride, a crystalline compound often known in the United States as procain and sometimes designated as Kapp's serum, after Josef Franz Kapp (New York).^{*} It is six times less toxic than cocain, passes slowly into the general circulation, and its local action, favored by the addition of adrenalin, is neither irritative for the infiltrated zone nor injurious to the vitality of the tissues, these properties rendering it the anesthetic of choice for local as well as regional anesthesia. At the beginning, because of the inadequate technique and lack of proper instrumentarium, this method was used by only a very small group of operating surgeons. Numerous accidents were reported and strong opposition arose against its use. But in the course of time, the technique was greatly improved, and with the introduction of modern type needles and syringes, the apparently impracticable and cumbersome method of Reclus developed into the practical and widely used infiltration anesthesia of today.

REGIONAL METHOD

In conformity with the advance of medical and surgical science, various research workers and surgeons endeavored to overcome the disadvantages of the infiltration method. So-called regional anesthesia developed in the course of time. Its application differs greatly from the infiltration procedure, where the solution is injected more or less at random into the tissues. In the regional method, the anesthetic solution is deposited at the point of origin of the nerve groups, or at some place along

*Read and cases demonstrated before a special meeting of the Washoe County Medical Society, Nevada, on October 8, 1931.

^{*}Dorland's Medical Dictionary, Fifteenth Edition, 1929, page 836.

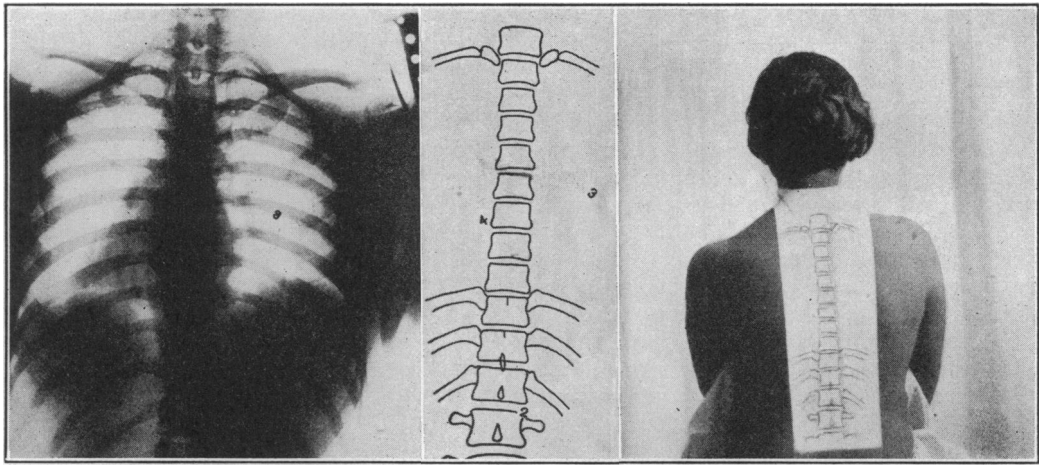


Fig. 1

Fig. 2

Fig. 3

Fig. 1.—Represents an x-ray plate taken on an experimental case. Three opaque markers are placed on patient's skin, superimposed on tattoo mercurochrome markings. The place where markers were fixed with adhesive are marked on the x-ray picture with numbers 2, 3, and 4.

Fig. 2.—Represents processed lantern-slide image, prepared from x-ray plate in which only contours of the vertebrae, ribs, and transverse processes are visible. The spots where the opaque markers were placed are marked with numbers 2, 3, and 4.

Fig. 3.—Shows how the lantern slide is projected back on patient's skin. Observe that the numbers 2, 3, and 4 superimpose over tattoo marks placed on patient's skin; in this way normal relative dimensions are maintained.

the nerve trunk near its origin, so that the entire region supplied by the specific nerve or nerve groups and its branches is anesthetized.

Here again, France led the way and Victor Pauchet was among the first to point out the great advantages of this method. In Germany, H. Braun and his followers advocated its adoption. Dr. Charles Mayo, who in 1920 was present at one of Pauchet's operations under regional anesthesia, asked for permission to take Pauchet's pupil and anesthetist, Gaston Labat, with him to the Mayo Clinic in Rochester. Dr. Labat, who had been Pauchet's anesthetist during three years and become an expert, remained for one year in the Mayo Clinic. Upon his arrival, he began his lectures at the Mayo Clinic Foundation. His excellent and invaluable work is chiefly entitled to credit for the present success and widespread use of regional anesthesia in the United States.

DEVELOPMENT OF REGIONAL ANESTHESIA

It is not our intention in this paper to link intraspinal anesthesia or so-called subarachnoid block with regional anesthesia proper, although spinal anesthesia can be regarded as an extensive nerve block. For the present, we wish to approach the problems of regional anesthesia proper. The progress of regional anesthesia was rather slow. This fact is due to four principal factors:

1. The anesthetist must have a very accurate knowledge of anatomy, more particularly osteology.

2. A high degree of skill and mastery of technique is required, so that the anesthesia may be induced quickly and without danger.

3. The length of time required for the blocking of several nerves is rather considerable, especially when such a block is bilateral, even with the most skilled operators.

4. Lack of exact knowledge of the situation of bony landmarks. Hence the exact localization of the nerves to be blocked involves great difficulties,

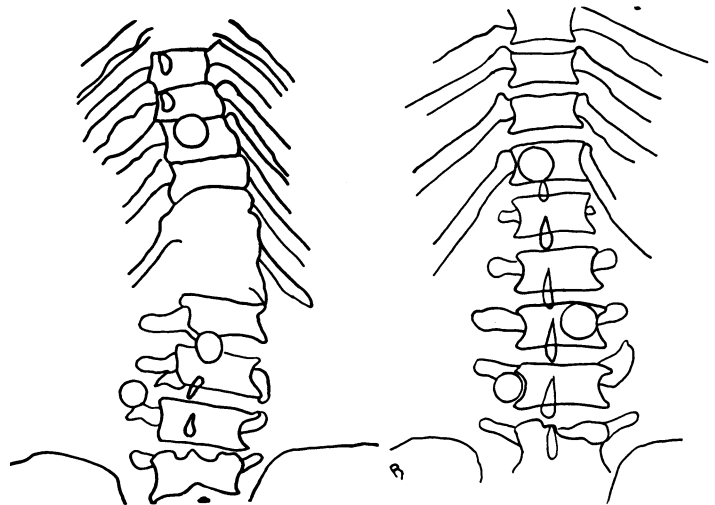


Fig. 4

Fig. 5

Fig. 4.—Represents processed lantern slide taken from x-ray plate made for an experimental case at the Kings County Hospital, New York City. Observe the rotations of transverse processes and malformation of same as well as the general deformities of spine. Without the x-ray localization, blocking of such a case would be practically impossible.

Fig. 5.—Processed plate made from x-ray plate from an experimental case at the Kings County Hospital, New York City. Note and compare the size of the first right lumbar transverse processes and the fourth right lumbar transverse processes. Without the x-ray visualization there would be great difficulty in locating the first transverse processes.

meets with serious obstacles, and may be dangerous where therapeutic alcohol block is employed.

TWO TYPES OF BLOCK ANESTHESIA

Regional anesthesia may be divided into two parts:

1. Field block anesthesia, in which the solution is distributed in certain definite planes in a fan-like manner, so as to reach all nerves crossing these planes.

2. Nerve block proper, where the anesthetic solution is deposited extraneurally or paraneurally in such close vicinity to the nerve trunk that its conductivity is interrupted by the action of the anesthetic agent.

NERVE BLOCK ANESTHESIA

This paper does not deal with the field block, the technique of which is relatively easily mastered. Conditions differed in the case of nerve block. Topographical anatomy contains the fundamentals upon which the entire knowledge of regional anesthesia depends. Visualization of superficial and deep bony landmarks and prominences, as well as the knowledge of their relation to the nerves to be blocked, are of the highest importance in this connection. The estimation of the length, width and depth of such bony landmarks has proved the chief technical difficulty. Our dissecting room experiences have rendered all of us familiar with the innumerable skeletal variations. This is particularly true with respect to the forms and shapes of the transverse processes of the vertebrae, the configuration of the ribs, the situation and direction of sacral foramina. (See Fig. 4-5.)

Palpating and locating the superficial bony prominences is always essential in guiding the needle into the deep structures. Such palpation, while possible in lean patients, is most confusing in fat and flabby individuals. This last mentioned group, remarkably enough, forms the larger contingent of patients requiring nerve blocking in one form or another.

The anesthetist must rely exclusively on his mental picture of the underlying skeleton and upon the development of his tactile sense for the localization of the indeterminate deep bony landmarks which serve as his only guide for a proper localization of the nerves to be anesthetized. The following picture is familiar to all of us:

PROCEDURE IN NERVE BLOCK ANESTHESIA

A patient is chosen to be operated upon under nerve block anesthesia. Instruments and solution are carefully checked and prepared. The patient is placed upon the operating table, and the tedious procedure of locating the necessary nerve trunks is begun. Even at the hands of the most skilled experts there is a necessity for continuous introduction and withdrawal of the blocking needle, with numerous changes of its direction, until finally the deep landmarks are located, the position

of the needle is changed once again and the injection is applied. Many times the patient moves and the search for the deep landmark must be resumed, causing additional traumatism and exhausting the patient as well as the surgeon. When such a procedure is bilateral and when several nerves are to be injected, the work is often abandoned unfinished, and general anesthesia is called for. Should this be the case for therapeutical block, the patient is greatly discouraged and very seldom consents to the repetition of the procedure. When the operation is at an end, we are usually asked by the hospital superintendent (who greets us with an indulgent smile) to begin our future operations at 7 or 8 a. m.

During the past two and a half years, I have had the privilege of watching and assisting some of our leaders during numerous nerve blocks. Yet, even in this relatively short period of time, working with a comparatively selected group of patients, some failures were observed, due to the anatomical difficulty in locating the necessary landmarks within the allotted time.

Now, if there exists a small percentage of failures at the hands of such great experts, no wonder the average surgeon meets with numerous unsuccessful attempts and is discouraged. No method, no matter how efficient or advantageous, is of real value, unless it can be duplicated by others.

The popular belief, that all we have to do to become proficient in regional anesthesia is to take a course in one or another institution offering such courses, is a pure illusion. Without the basic knowledge of anatomy and physiology, the student will meet with failure.

The education and development of the tactile sense for location of various deep structures in connection with nerve block may be a remarkable accomplishment, but it is not scientific. The tracing of such landmarks on the surface of the skin, using arbitrary schematic formulas (a definite number of centimeters from the spinal processes, et cetera), is far from being accurate, particularly in the presence of skeletal abnormalities, as exist in a great majority of cases.

Alcohol Block.—In therapeutic alcohol block, all the foregoing factors are emphasized, because of the smaller amount of solutions which can be permissibly injected and the greater accuracy required in locating the nerve trunks. Here also the question remains whether or not there is any osteoarthritic production along the bony structures in the vicinity of the nerve trunk to be injected, which may in some cases surround, overlap and even compress the corresponding nerve trunk. This demonstration is of the highest importance. The necessity for visualization, contours and topographical relations of such osteoarthritic productions, prior to the introduction of the needle is indisputable.

(To Be Continued)